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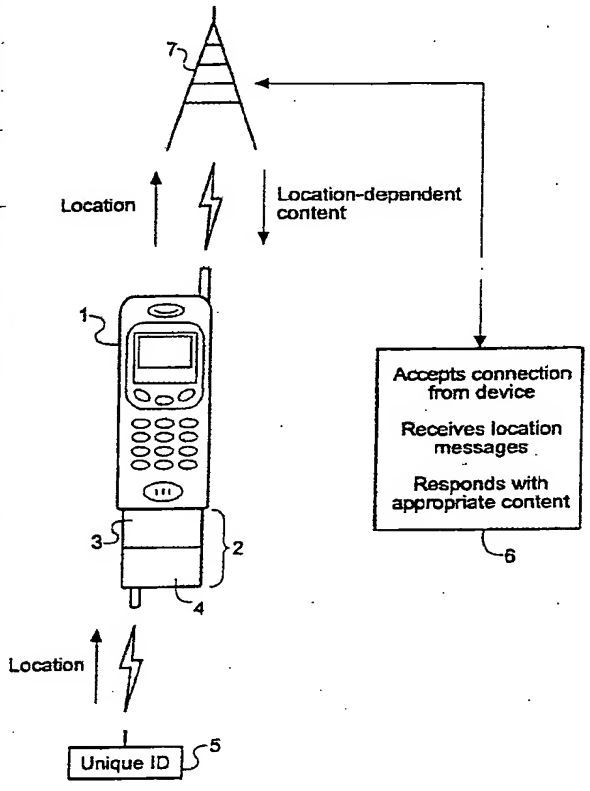
(54) Title: IMPROVEMENTS RELATING TO INFORMATION DELIVERY



(57) Abstract: A system and method for delivering location-specific information to a mobile telephone (1) or the like. A module (2) comprising a receiver (3) and a processor (4) is attached to the mobile telephone (1), and a plurality of transmitters (5) are placed at various predetermined locations, for example works of art in an art gallery. The transmitters (5) are each adapted to transmit a unique code signal within a predetermined range therefrom. Each work of art in the art gallery is located close to a transmitter (5), and the unique coded signal from each transmitter (5) is associated in a central control system (6) with information relating to the work of art close to that transmitter (5). When the module (2) receives a coded signal from a transmitter (5), it causes the mobile telephone (1) to pass this code information to the central control system (6). The central control system (6) then transmits the information associated with the work of art back to the mobile telephone (1) as an audio or visual commentary for appreciation by a human user.

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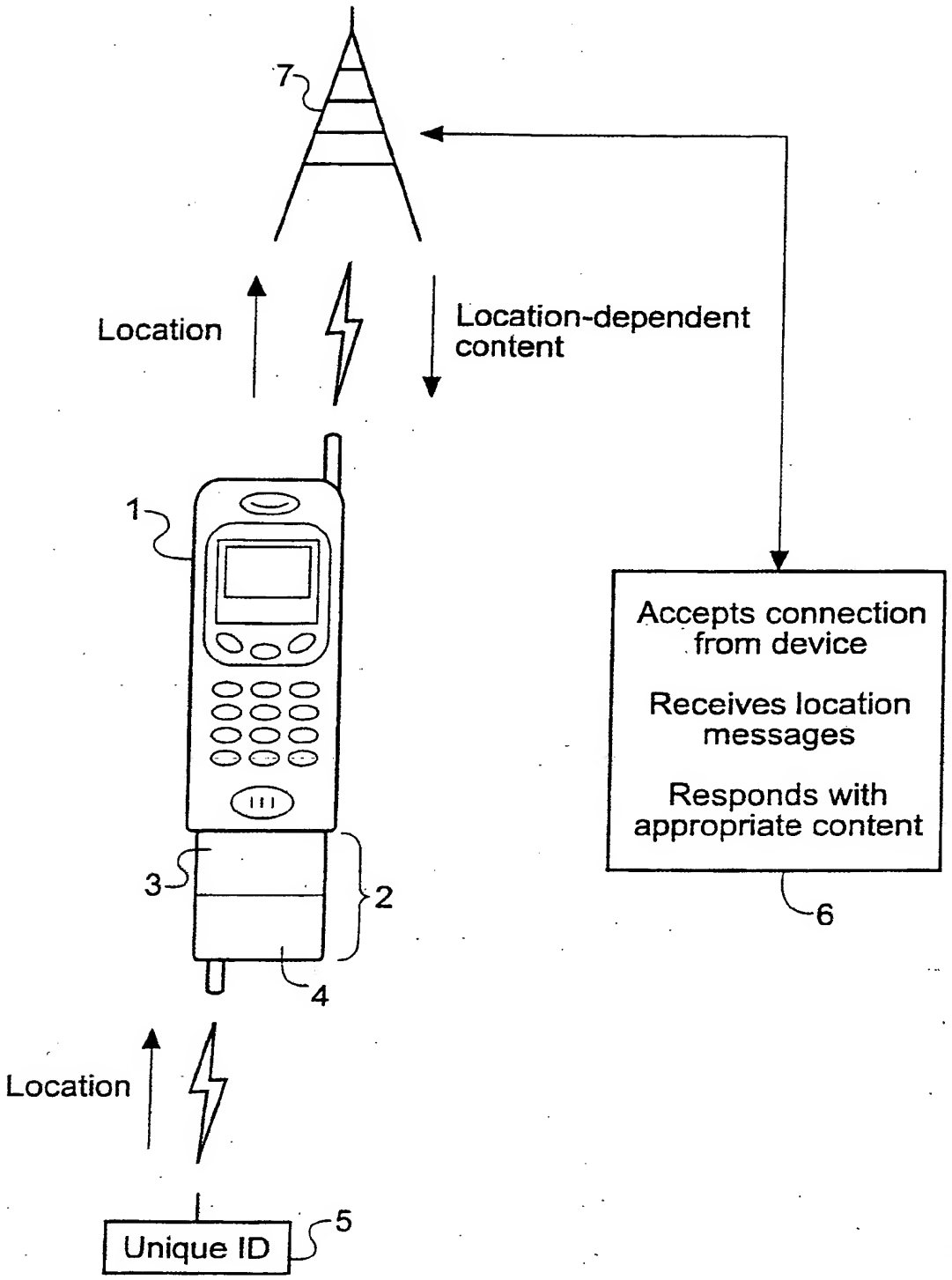
7
Location
Location-dependent content
1
Accepts connection from device
Receives location messages
Responds with appropriate content
6
3
2
4
Location
Unique ID
5

Fig.1

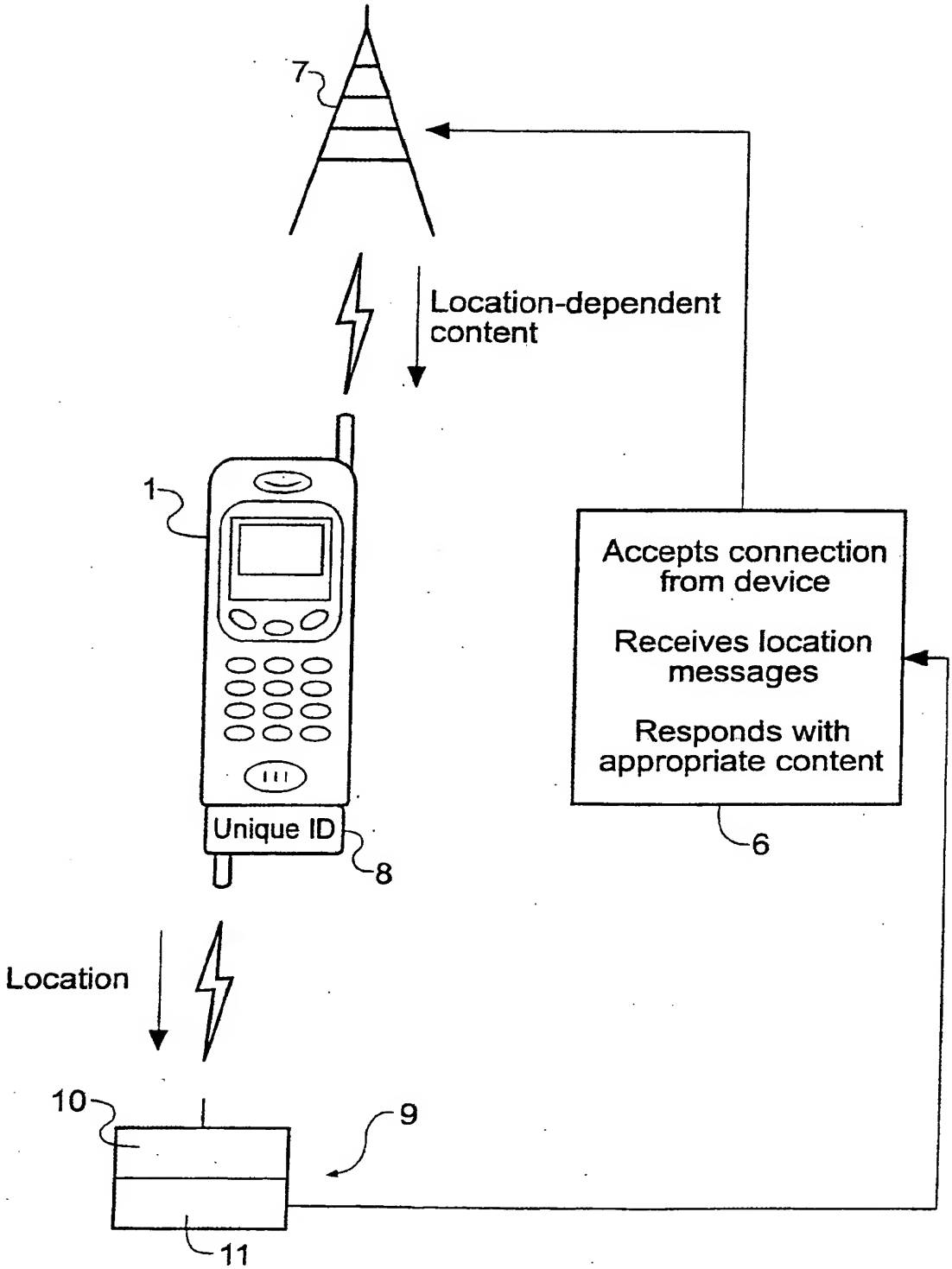
7
Location-dependent content
1
Accepts connection from device
Receives location messages
Responds with appropriate content
6
Unique ID
8
Location
10
9
11

Fig. 2

D scription

IMPROVEMENTS RELATING TO INFORMATION DELIVERY
This invention relates to a new information delivery system and a method of providing information delivery.

Cellular telephone systems currently provide the operators thereof with information about the geographic position of a user to within the accuracy of one"cell", which is often several square kilometres in size, or one sector of a cell. Systems now in development will soon enhance the positioning resolution down to a few metres or better, either by integrating GPS (the satellite-based Global Positioning System) receivers into each telephone, or by taking advantage of the existing cellular radio signal through measurement of time of arrival, time difference of arrival (for example the CURSOR system designed by Cambridge Positioning Systems Ltd.) or angle of arrival (for example the TeleSentinel system from KSI Inc.)
All of these approaches have the following limitations:
The positioning information is only accurate to within a few metres at best
* They suffer from loss of signal indoors (particularly in the case of GPS)
Portable devices are known which act as audio guides for museums, providing audio appropriate to the item that a visitor is viewing, or room in which he or she is standing (referred to hereafter simply as a"location"). These work in one of several ways:
Cassette player: The most common type is simply an audio-cassette player controlled manually by the visitor, talking him or her through the various locations. The user may pause or rewind the programme.

Radio station: A very low-power radio station broadcasts from each location (possibly with low-frequency magnetic fields or infra-red), and a receiver carried by the visitor receives only the information local to the item he or she is viewing (the
user may possibly be able to tune to different radio channels for different languages).

An example is the Easy Guide device produced by ColourArt.

Digital storage: The guide narrations are stored on the portable device itself, for example in solid-state memory or on disc, and coded radio transmitters in each location trigger the device to play back the appropriate narration-an example is the Easy Guide device with optional Flash card.

The"cassette player"approach has the following limitations:
It is entirely manual-the device tells the user where to walk next and the user must follow the directions to hear audio that is relevant.

Audio playback is not context-sensitive.

'No opportunity for feedback from the user to the operator.

The"radio station"approach has the following limitations:
'It requires a relatively expensive custom device to receive the broadcasts.

It may not be under the full interactive control of the user, and cannot be paused, rewound etc.

It cannot easily be personalised to each user's changing preferences.

The shape and size of the region covered by each location is not easily controllable.

* No opportunity for feedback from the user to the operator.

The"Digital Storage"approach has the following limitations:
It requires a relatively expensive custom device to play back the narrations.

The information may go out of date, whereupon every device must be updated. This precludes delivery of real-time information.

To offer the user a free choice of alternative narrations (such as versions in

different languages), much greater storage capacity is required and the capacity used by the alternatives not chosen is wasted.

No opportunity for feedback from the user to the operator.

According to a first aspect of the present invention there is provided a local information delivery system comprising either a low-power transmitter placed at each of a plurality of locations and a receiver and processor attached to a standard wireless communications device, or a low-power transmitter attached to a standard wireless communications device and a receiver and processor placed at each of a plurality of locations, the processor in either case being adapted to distinguish a unique code transmitted by the transmitter and thereby to send a message to a central control system identifying and locating the wireless communications device and thereby to deliver location-specific information to the wireless communications device.

Such a system is advantageous because it combines a familiar, standard, low-cost wireless communications device (which a visitor may already own) together with a low-cost device which controls the flow of information to the wireless communications device, providing a low-cost, location-sensitive solution to information delivery, with potentially very high spatial resolution.

According to a second aspect of the present invention, there is provided a method of delivering location-specific information to a wireless communications device, in which: i) a low-power transmitter is attached to the wireless communications device; ii) a plurality of receivers each including a processor is distributed over a plurality of locations; iii) the low-power transmitter transmits a code unique to that transmitter to at least the nearest of said receivers; iv) the processor of said receiver sends a signal to a central control system including both the code and information regarding the location of the wireless communications device with reference to the locations of said plurality of receivers; v) the central control system identifies and locates the wireless communications device by way of the code and the location information provided by the processor and delivers location-specific information to the wireless communications device.

According to a third aspect of the present invention, there is provided a method of delivering location-specific information to a wireless communications device, in which: i) a plurality of low-power transmitters is distributed over a plurality of locations; ii) a receiver including a processor is attached to the wireless communications device; iii) each of the plurality of low-power transmitters transmits a ~~code~~ unique to that transmitter, the code being receivable by said receiver; iv) the processor, upon reception of said code from said receiver, sends a signal to a central control system including both the code and information regarding the location of the wireless communications device with reference to ~~the locat~~ions of said plurality of transmitters; and v) the central control system identifies and locates the wireless communications device by way of the code and the location information provided by the processor and delivers location-specific information to the wireless communications device.

Such a method is advantageous because it provides much smaller location resolution than is possible with existing or envisaged cellular networks, and provides a low-cost means of delivering location-dependent information by reusing existing mass-market ~~cellu~~lar telephones and the like.

The wireless communications device may be of any common type, being for the purposes of this invention any system which provides its user with information received from a network. It may for example provide information via audio (possibly via a headset), or text (possibly via Short Message Service (SMS), Wireless
Application Protocol (WAP), HTML or other network protocol), or even video. It may additionally allow some form of user-input back to the central control system (including, but not limited to, DTMF (Dual-Tone Multi-Frequency) keypad tones).

The low-power transmitter ("transmitter") may be of any type, accepting digital data and transmitting it either as electromagnetic waves in the visible, infra-red or radiofrequency parts of the spectrum, or emitting audible tones, possibly ultrasonic, and using any modulation scheme including but not limited to amplitude-keying, amplitude modulation, frequency-keying, frequency-modulation, frequency-hopping or spread-spectrum. Alternatively, the transmitter may operate by modulating an existing form of radiation, for example a light bulb.

The receiver is matched to the characteristics of transmissions from the transmitter, translating the received data back into digital form.

According to a fourth aspect of the present invention, there is provided a microprocessor or

microcontroller adapted for use with the system and methods hereinbefore described, the microprocessor or microcontroller being operable to process data received by the receiver and to cause data regarding a location of the wireless communications device to be sent to the central control system.
The processor is attached to the receiver and may be any type of microcontroller or microprocessor, running a software program which interprets the data from the receiver and sends a message to the central control system informing it of the location of the wireless communications device.

As explained above, either the transmitter is attached to the wireless communications device and a receiver placed at each location, or a receiver is attached to the wireless communications device and a transmitter placed at each location. In the former case, the location-based receiver sends information about nearby transmitters (users) to the central control station, possibly by wires, radio transmission or other means. In the latter case, the user-based receiver sends information about nearby transmitters (locations) to the central control station, possibly by sending DTMF tones or other signalling either carried over the wireless communications device's voice, data or network control bands.

The central control system is interfaced to each user's wireless communications device via the device's normal network, which might be a dialled-up cellular connection, local wireless network, or some other networking protocol such as
Wireless Application Protocol (WAP), point-to-point infra-red data transfer possibly using the Infra-red Data Association protocol or Bluetooth (a short-range radiofrequency protocol from Ericsson et al. which enables two or more wireless devices to be networked together in a"scatternet"), possibly also travelling via the Public
Switched Telephone Network (PSTN). As the central control system receives messages from the processing means attached to the receiver, it modifies the data that it delivers to the wireless communications device. For example, the central control system could be a voicemail system (possibly controlled by DTMF tones), or a server running a menu-driven WAP application or a transaction and billing system.

The wireless communications device may be a cellular telephone or videophone (for example GSM, PCS, UMTS or TETRA), or a cordless telephone (for example
DECT), or a personal digital assistant (PDA) with a wireless interface (e. g. Palm
Pilot VII (g)), or a wireless headset (e. g. using the Bluetooth wireless protocol) which may include means for delivering audio information by way of earphones and, optionally, visual information by way of a head-up display device.

Each receiver may optionally have a means to compare the signal-strength or time-ofarrival of transmissions from several transmitters, allowing the system to determine the location of the user to a greater resolution than simply to the nearest transmitter or receiver.

Optionally the system may be partly controlled by the location system described, and partly by the user, allowing the user to operate either in"automatic"mode with the system providing appropriate information as he or she moves about, or to take "manual"control at any point, for example to hear information paused or repeated, or to hear more or different information.

The transmitter or receiver attached to the wireless communications device may:
* be permanently or temporarily attached
optionally have an antenna or other interface which is directional, providing information about the direction in which the wireless communications device is pointing or equivalently the orientation in which it is being held
optionally include a component for detecting the orientation of the device in one or more dimensions relative to the pull of the Earth's gravity or the direction of the Earth's magnetic field
be powered by the wireless communications device's battery, or powered by its own internal power source, which may be a primary or secondary cell, or even an inductive pickup
The receiver may optionally be adapted to enter a state of very low powerconsumption until a new transmission is detected.
Each location may be fixed or may be mobile, with a system potentially comprising some fixed and some mobile locations.

Both a transmitter and receiver may optionally be attached to the wireless communications device, allowing two-way information transfer independent of the wireless communications device's network. This effectively makes every"user"also a"location", allowing users to obtain information about each

other (social systems).

Optionally the system may detect attempts to take the attached device away from the zone of operation (for example, the museum) and remind the user to return the device.

Optionally the central control system may be provided with a means for users to leave a message about each location, in either voice, text or other formats, which will then be available to other users.

Optionally the central control system may provide information about the location of users, to a central display, or to other users or groups of users, or to an external network such as the Internet, providing a useful means of finding lost children, parents etc., and of tracking customer behaviour.

Optionally, the transmitting means of this invention may be any transmitting means already incorporated into the wireless communications device, such as those described hereinabove, including Bluetooth and IrDA.

Optionally, the processor of this invention may be a processor already incorporated into the wireless communications device.

Optionally, the receiver of this invention may be any receiver already incorporated into the wireless communications device, such as those described hereinabove, including Bluetooth and IrDA. Optionally, the wireless communications device may be used in conjunction with a "hands-free"earpiece or headset. In such a case, any directionality-sensing apparatus may be incorporated into the"hands-free"equipment rather than the wireless communications device itself, thus better sensing the direction in which the user's attention is focussed.

For a better understanding of the present invention and to show it may be carried into effect, reference shall now be made, by way of example, to the accompanying drawings, in which:
FIGURE 1 shows a first embodiment of the present invention in which a receiver and processor means is attached to mobile telephone; and
FIGURE 2 shows a second embodiment of the present invention in which a transmitter is attached to a mobile telephone.

Referring firstly to Figure 1, there is shown a mobile telephone 1 to which is attached a module 2 comprising a processing unit 3 and a receiving unit 4. The module 2 is attached to the mobile telephone 1 by way of a standard I/O port (not shown) which is commonly found on all standard mobile telephones. A low-power transmitting unit 5 is positioned at a specific location, which for the purposes of the present example may be taken to be a location where a given work of art (not shown) is located in an art gallery. The transmitting unit 5 is adapted to transmit a code signal unique to itself within a predetermined range therefrom. Each work of art in the art gallery is located close to a transmitting unit 5 which transmits a unique coded signal.

A central control system 6, in the form of an electronic computer, is provided in the art gallery and connected to or otherwise in communication with an antenna 7 adapted to transmit audio information representative of the various works of art displayed in the art gallery to standard mobile telephones 1. When a person enters the art gallery, he or she is provided with the module 2 which is then attached to his or her mobile telephone 1 by way of the standard I/O port. As the person moves around the art gallery to view the works of art, the receiving unit 4 receives code signals from the transmitting units 5. The transmitting units 5 transmit their code signals only within a given range, so that the receiving unit 3 only receives the code signal when the person with the mobile telephone 1 is in close proximity to a given work of art. When the receiving unit 3 receives a coded signal from a given transmitting unit 5, it passes the signal on to the processing unit 4, which then activates the mobile telephone 1 to transmit the coded signal by way of its own standard communication protocol to the antenna 7 and hence to the central control system 6. The signal received by the central control system 6 includes the coded signal, which identifies the transmitting unit 5 and thereby its associated work of art, and also information regarding the identity of the mobile telephone 1. The central control system 6 is then able to determine the identity of the mobile telephone 1 and also that it is in close proximity to a given transmitting unit 5 and associated work of art. The central control system 6 then causes the antenna 7 to transmit to the mobile telephone 1, by way of the standard communication protocol of the mobile telephone 1, a narrative regarding the work of art. As the person visiting the art gallery moves from one work of art to another, the receiving unit 3 receives coded signals from different transmitting units 5 each associated with a different work of art, and the central control system 6 is therefore able to determine the location of the person in relation to the works of art and to transmit a narrative appropriate to each individual work of art to the mobile telephone 1 as the person moves around the art gallery.

When the person leaves the art gallery, he or she will detach the module 2 from his or her mobile telephone 1 and return the module to the art gallery for use by another visitor.

Alternatively, as shown in Figure 2, there is shown a standard mobile telephone 1 to which is attached, by way of the I/O port of the mobile telephone 1, a module 8 comprising a low-power transmitting unit. The module 8 functions in a similar manner to the transmitting unit 5 of the embodiment of Figure 1, and is adapted to transmit a code signal unique to itself within a predetermined range therefrom. Each work of art in the art gallery is provided with a module 9 which includes a receiving unit 10 and a processing unit 11 and which is in communication with the central control system 6 by way of any appropriate means. As before, the central control system 6 is in communication with an antenna 7 adapted to transmit audio information representative of the various works of art displayed in the art gallery to the standard mobile telephone 1.

When a person enters the art gallery, he or she is provided with the module 8 which is then attached to his or her mobile telephone 1 by way of the standard I/O port. As the person moves around the art gallery to view the works of art, the receiving units 10 of the modules 9 associated with the works of art receive a code signal from the module 8 attached to the mobile telephone 1. The module 8 transmits its code signal only within a given range, so that the receiving units 10 only receive the code signal when the person with the mobile telephone 1 is in close proximity to a given work of art. When a receiving unit 10 receives a coded signal from a nearby module 8, it passes the signal on to its associated processing unit 11, which then communicates the coded signal and information relating to its identity and location to the central control system 6. The signal received by the central control system 6 includes the coded signal, which serves to identify the module 8, and also information identifying the location of the module 9 and hence its associated work of art. The central control system 6 is thus able to determine the identity of the mobile telephone 1 and also that it is in close proximity to a given module 9 and associated work of art. The central control system 6 then causes the antenna 7 to transmit to the mobile telephone 1, by way of the standard communication protocol of the mobile telephone 1, a narrative regarding the work of art. As the person visiting the art gallery moves from one work of art to another, the receiving units 10 in turn receive the coded signal from the module 8, and the central control system 6 is therefore able to determine the location of the person in relation to the works of art and to transmit a narrative appropriate to each individual work of art to the mobile telephone 1 as the person moves around the art gallery. When the person leaves the art gallery, he or she will detach the module 8 from his or her mobile telephone 1 and return the module 8 to the art gallery for use by another visitor.

Claims

CLAIMS: 1. A local information delivery system comprising either a low-power transmitter placed at each of a plurality of locations and a receiver and processor attached to a standard wireless communications device, or a low-power transmitter attached to a standard wireless communications device and a receiver and processor placed at each of a plurality of locations, the processor in either case being adapted to distinguish a unique code transmitted by the transmitter and thereby to send a message to a central control system identifying and locating the wireless communications device and thereby to deliver location-specific information to the wireless communications device.

2. A system as claimed in claim 1, wherein the wireless communications device is a mobile telephone or mobile videophone.

3. A system as claimed in claim 1, wherein the wireless communications device is a pocket computer device such as a personal digital assistant provided with a wireless communication interface.

4. A system as claimed in claim 1, wherein the wireless communications device is a wireless headset.

5. A system as claimed in any preceding claim, wherein the location-specific information is adapted to be output from the wireless communications device as an audio signal.

6. A system as claimed in any preceding claim, wherein the location-specific information is adapted to be output from the wireless communications device as a visual signal, for example in the form of text, graphics or video.

7. A system as claimed in any preceding claim, wherein the receiver is adapted to compare signal-strength or time-of-arrival of transmissions from several transmitters so as to enable the system to determine a location of the wireless communications device.

8. A system as claimed in any preceding claim, wherein the wireless communications device is operable to issue control signals to the central control system.

9. A system as claimed in any preceding claim, wherein the transmitter or receiver attached to the wireless communications device is releasably attached thereto.

10. A system as claimed in any preceding claim, wherein the transmitter or receiver attached to the wireless communications device includes an antenna or other interface that is directional, thus enabling information regarding a spatial orientation of the wireless communications device to be communicated to the central control system.

11. A system as claimed in any preceding claim, wherein the transmitter or receiver attached to the wireless communications device is adapted to detect a spatial orientation of the wireless communications device with respect to a terrestrial magnetic or gravitational field, thus enabling information regarding the spatial orientation of the wireless communications device to be communicated to the central control system.

12. A system as claimed in any preceding claim, wherein both a transmitter and a receiver is attached to the wireless communication device, thereby enabling two-way information transfer independently of any communications protocol associated with the wireless communications device itself.

13. A system as claimed in any preceding claim, wherein the transmitter and the receiver communicate information by way of a communications protocol independent of any communications protocol associated with the wireless communications device itself.

14. A system as claimed in any one of claims 1 to 11, wherein the transmitter and the receiver communicate information by way of a communications protocol already associated with the wireless communications device itself.

15. A method of delivering location-specific information to a wireless communications device, in which: i) a low-power transmitter is attached to the wireless communications device; ii) a plurality of receivers each including a processor is distributed over a plurality of locations; iii) the low-power transmitter transmits a code unique to that transmitter to at least the nearest of said receivers; iv) the processor of said receiver sends a signal to a central control system including both the code and

information regarding the location of the wireless communications device with reference to the locations of said plurality of receivers; v) the central control system identifies and locates the wireless communications device by way of the code and the location information provided by the processor and delivers location-specific information to the wireless communications device.

16. A method of delivering location-specific information to a wireless communications device, in which:
i) a plurality of low-power transmitters is distributed over a plurality of locations; ii) a receiver including a processor is attached to the wireless communications device; iii) each of the plurality of low-power transmitters transmits a code unique to that transmitter, the code being receivable by said receiver; iv) the processor, upon reception of said code from said receiver, sends a signal to a central control system including both the code and information regarding the location of the wireless communications device with reference to the locations of said plurality of transmitters; and v) the central control system identifies and locates the wireless communications device by way of the code and the location information provided by the processor and delivers location-specific information to the wireless communications device.

17. A method according to claim 15 or 16, wherein the location-specific information is output from the wireless communications device as an audio signal.

18. A method according to claim 15 or 16, wherein the location-specific information is output from the wireless communications device as a visual signal, for example in the form of text, graphics or video.

19. A method according to any one of claims 15 to 18, wherein the transmitters and the receivers communicate information by way of a communications protocol independent of any communications protocol associated with the wireless communications device itself.

20. A method according to any one of claims 15 to 18, wherein the transmitters and the receivers communicate information by way of a communications protocol already associated with the wireless communications device itself.

21. A microprocessor or microcontroller adapted for use with the system of claims 1 to 14 and the method of claims 15 to 20, the microprocessor or microcontroller being operable to process data received by the receiving means and to cause data regarding a location of the wireless communications device to be sent to the central control system.

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IMPROVEMENTS RELATING TO INFORMATION DELIVERY

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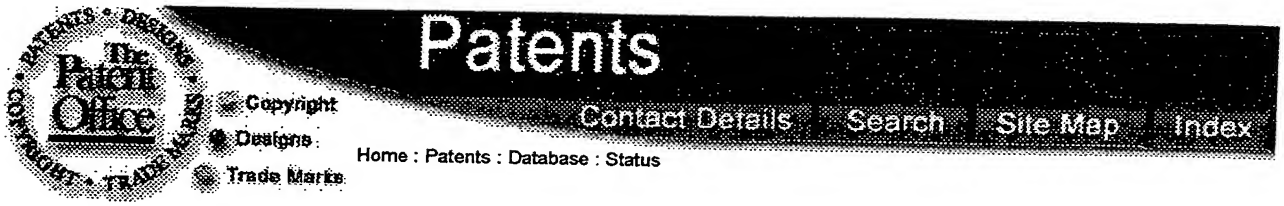
Cited patent(s):	DE19747745; GB2326550; FR2768249; GB2325975; GB2309523; WO9949682; JP6334582

Abstract

A system and method for delivering location-specific information to a mobile telephone (1) or the like. A module (2) comprising a receiver (3) and a processor (4) is attached to the mobile telephone (1), and a plurality of transmitters (5) are placed at various predetermined locations, for example works of art in an art gallery. The transmitters (5) are each adapted to transmit a unique code signal within a predetermined range therefrom. Each work of art in the art gallery is located close to a transmitter (5), and the unique coded signal from each transmitter (5) is associated in a central control system (6) with information relating to the work of art close to that transmitter (5). When the module (2) receives a coded signal from a transmitter (5), it causes the mobile telephone (1) to pass this code information to the central control system (6). The central control system (6) then transmits the information associated with the work of art back to the mobile telephone (1) as an audio or visual commentary for appreciation by a human user.



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CURRENT REGISTER DETAILS FOR GB2309523

Form 1 Application No GB9601327.1 filing date 23.01.1996

Title A LOCATION-DEPENDENT MESSAGE SYSTEM

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Classified to
G1F H4B
G01C G01S

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Examination requested 21.01.1998

**** END OF CURRENT DETAILS ****

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CURRENT REGISTER DETAILS FOR GB2325975

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Priority claimed:
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Title PORTABLE INFORMATION-PROVIDING APPARATUS

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G1F G5G H4D
G01C G01S G09B

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Title of Granted Patent PORTABLE INFORMATION-PROVIDING APPARATUS

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Year of Last Renewal	6

Date Next Renewal Due 29.07.2003

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